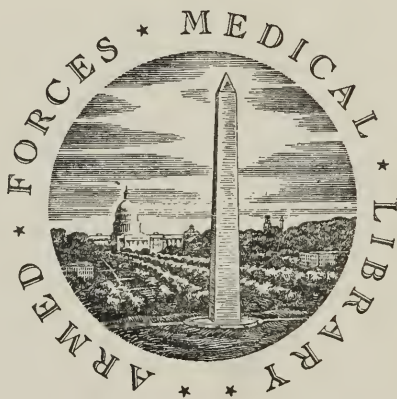


UNITED STATES OF AMERICA



FOUNDED 1836

WASHINGTON, D.C.

OBSERVATIONS
ON THE MANAGEMENT OF
PERUVIAN BARK,
SUBMITTED AS AN
INAUGURAL DISSERTATION,
FOR THE DEGREE OF
DOCTOR OF MEDICINE:
TO THE EXAMINATION OF THE
REV. JOHN EWING, S. S. T. P. Provost;
THE
TRUSTEES AND MEDICAL FACULTY
OF THE
UNIVERSITY OF PENNSYLVANIA,
on the twenty-seventh day of May, 1802,
BY WILLIAM NELSON,
OF VIRGINIA.

—••—
“Pulsus debilioris animator, & frequentioris
moderator.”

—••—
Philadelphia:

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TO
WILLIAM NELSON, Esq.,
One of the Judges of the Gen ral Court of Virginia,
THIS DISSERTATION

IS DEDICATED
as a mark of cordial gratitude
FOR HIS FATHERLY PROTECTION,
AND FOR THE MANY VALUABLE
PRECEPTS RECEIVED FROM HIM
thro' a long and arduous
GUARDIANSHIP
by his affectionate NEPHEW:

ALSO TO
AUGUSTINE SMITH, M. D.
as an humble testimony
OF THE HIGH ESTIMATION
in which his
PROFESSIONAL TALENTS
ARE HELD
by his respectful friend

WILLIAM NELSON.

It is to be lamented that the association of certain diseases and remedies in the minds of physicians, becomes so fixed, as to refuse to yield to the influence of reason. Thus pain and opium, dropsy and foxglove, low spirits and assafoetida, and above all, an intermitting fever and bark, are all connected together in common practice as mechanically, as the candle and the snuffers are in the mind of an old and steady house servant.

Rush's Inquiries, Vol. IV.

*Observations on the management of Peruvian
Bark &c.*

TO enquire at this period into the constituent principles and medical properties of Peruvian Bark would be superfluous. It would be only to retrace a path, which has been long since opened, and which has become familiar to all; or to transcribe the investigations which have been ardently directed to their developement by many accurate and faithful experimentalists.

The diseases to which Bark is best adapted have been marked out, and its habitudes with other substances have not escaped notice. Little else remains to be done.

After the Bark had cleaved its way thro the strong barrier of prejudice, which opposed its progress on the continent of Europe, to the rank which awaited it in the *Materia Medica*, the success which was occasionally experienced from it in Intermitting Fever, drew to it the splendid-Character of a *Specificick*. This was a passport, which exempted it from fallibility in any case, and secured to it an exclusive employment in all. It was applied indiscriminately in intermitting forms of disease, without distinguishing the cir-

cumstances which condemned its use from those which justified it. It is to be lamented that modern practice should be infected with prejudices equally erroneous. Under their influence, this valuable Medicine is frequently administered with manifest injury to the patient and its own reputation.

Our principal object shall be, an attempt to point out the causes, which have prevented invincible success in the use of Bark in Fever, and to ascertain the circumstances, which should regulate its management in order, to attain it.

Of the history and sensible qualities of P. Bark.

It is not intended, under this head, to give a botanical detail of the structure of the tree and its appendages, from whence this article is obtained. We shall barely mention that it grows promiscuously in the Forests of Peru, but most abundantly on the hills in the neighborhood of the City Loxa. It is said to grow to about the size of a Cherry-tree. It bears a flower which produces a pod containing a kernel like an Almond, from which the trees are spontaneously propagated.

As the arts owe many of their important improvements to accident, so medicine is deeply indebted to the same source, for its acquisition of this much and justly valued implement.

We are informed by the tradition of Peru, that a native (impelled by health-preserving instinct,) resorted to a neighboring pool, to allay an importunate thirst created by Fever. In this was contained not only the corrector of his temporary tortures, but the radical extinguisher of the disease which created them. For it had received into its bosom, all the Ganaprides* within reach, which had accidentally been deprived of their support; and by long maceration its water had become saturated with the virtues of their Bark.

From this first display of the powers of P. Bark, we have no farther accounts of the progress of its reputation among the natives of America. They were probably suppressed by the commotions excited among them, by the merciless devastations and cruelties of the Spaniards.

Nor do we hear any thing of it until these had subsided; when the authority of Spain was imposed on Peru, and its government vested in Viceroys.

In this æra a circumstance occurred, which first introduced a knowledge of the virtues of P. Bark, to the Europeans. The lady of the Viceroy Count del Cinchon, residing at Lima, was attacked with an Intermitting Fever. The report soon reached the ears of a physician of Loxa,

* One of the names by which the tree was known to the Natives.

who prevailed on the Count to give his lady the Bark; which being complied with, the Vice-queen speedily recovered. This event did not fail to arrest the attention of the Jesuit Fathers, who, however sordid their ultimate views might have been, suffered nothing to escape them which could contribute to the present benefit of society. Their pious exertions were diligently employed to extend its utility far and wide, and with that ardor which marked their dissemination of religion and science, they soon gained it a celebrity thro' Spain and Italy, which rapidly extended to Britain. Tho' it experienced a partial opposition at first, this yielded to the exertions of some eminent physicians which were successfully employed, for the universal establishment of its reputation.

All who have described the effects of the impression of Bark on the senses, ascribe to it a smell approaching to mustiness, combined with an obscure aroma; a durable bitter and astringent taste, to which the aroma is also perceptible. That it is bitter is allowed on all hands, and of its astringency we have a twofold proof derived from the taste and chymical reagency. It is upon the happy combination of both these principles in Peruvian Bark, that its general estimation as a medicine is founded.

Of the modus operandi of Bark.

The philosophy of the operation of medicines has been at all times considered as a matter involved in obscurity, not to be penetrated by the most acute investigation. Physicians observing that certain medicines were endowed with the aptitude to answer certain indications, have been contented to explain their effects by an astringent, a tonic operation, and others, according to the effects produced. But a very different aspect has been imparted to the subject, in late years. In this university, the body has undergone a division into several systems, giving rise to an appropriation of specific medicines to the respective diseases of each. In this distribution, the Peruvian bark has been assigned to those of the arterial system, and we think with good foundation. During the intermission of fever, when only the bark can be exhibited with safety and advantage, the arteries are in a condition to invite the principal exertion of its force; for at that period their excitability is increased. It may be argued, that the same condition would invite the operation of any other stimulating power, and consequently that bark cannot be an arterial specific. This is plausible, but readily gives way when we recollect that the most powerful stimulants are inadequate to the cure of

intermitting fever, while bark, if properly managed, rarely fails.

Bark does not only prove itself to be a specific for the arterial system, by curing its diseases, but farther by its exclusive operation on that system during the healthy state of the body ; when the distribution of the excitability cannot be so much in favor of the arteries, as while laboring under vicissitudes of high excitement and debility. This was demonstrated in several experiments, which were attended with the following results.

To a friend whose pulse beat 68 strokes in a minute, I gave two ounces of an infusion of yellow Peruvian bark. In 5 minutes his pulse rose to 72. It did not increase more in frequency till 15 minutes had elapsed, when it rose to 74 ; — in 20—70, with increased force. Now the same dose is repeated : in 25—76 ; in 45—80 : from this time it gradually lessened in frequency, and in 60—72, with considerable force.

Two days after I gave to the same friend two ounces of a decoction of red bark, his pulse now beating 66. In 5 minutes it beat 70 ; in 10—70 ; in 15—72 ; in 20—74 ; in 25—76 ; in 30—70. The dose repeated : in 35—72 ; in 40—72, having increased in activity ; in 50—76 ; in 60—74, with fullness. I performed other

experiments, the results of which, tho' not exactly similar, corresponded so far as to confirm, that the principal action of bark is exerted on the arteries.

Of its use in some diseases of the Arterial System.

The limits, which several considerations set to this essay, do not allow it to embrace or even glance at the long catalogue of diseases, in which the bark has been employed. Our observations will be confined to its use in the intermitting state of fever, and those feeble grades of morbid action, which accompany the gangrenous and low chronic states of fever.

From the first introduction of P. bark into the practice of medicine, it was thought endowed with virtues, which peculiarly adapted it to arrest the progress of intermitting fever. So deep-seated was the confidence of physicians in this power of the bark, that they not only relied on it as the infallible conqueror of that disease, to which certain uniform characters have attached the exclusive name of intermittent, but they resorted to it as the implement which promised most success, in their combats with diseases of far different characters, when these by the periodical cessation of their attacks, offered an advantageous contest.

Under this prepossession the variety of success, which accompanied the use of bark, is not to be wondered at. Its inefficacy might, no doubt, on some occasions be referred to inert additions, with which it is frequently vitiated by its avaricious venders. But accusations of its inactivity are much rarer, than those grounded on its excessive energy, so frequently exhibited in the aggravation of diseases in which it is administered. Hence it often, by its disproportionate operation, converts a fever, simple and easily restrained, into a wasteful, scarcely remittent causus, or hurries it to some more vital part, where it terminates in formidable schirrus, or incurable dropsy : not to mention apoplexy, palsey, and many other outlets, which it opens to human existence.

But an error, which has had considerable influence, in multiplying the instances of the perniciousness of bark, is a persuasion that intermittents always occur in cases of weak action. This has led to an unguarded adoption of it, without suspecting that they may be connected with a very opposite state,

Tho' this dangerous and unfounded doctrine has been condemned by the most accurate observation, it still prevails. Doctor Jackson who wrote from observation alone, remarks that tho'

an atonic state of the system is frequently connected with intermitting fever, this is by no means constantly the case; hence, says he, the disease is not invariably removed by those processes which excite tone. Excessive evacuations and other causes, by which the body has been reduced to the last state of debility, have often interrupted the course of an intermittent.

Some aware of the frequent connection of high inflammatory action with this disease, and the inutility of applying bark during its presence, have advised, for its reduction, that several paroxysms be submitted to. Those who know the tendency of this disease to degenerate into more untoward affections, and that this tendency is favored as much by a neglect, as by an improper treatment of it, will not be disposed to adopt such an indolent practice.

And others, for the same end, depend solely on the operation of emetics and purges. This practice appears to have originated in those days, when the elimination of morbid matter was thought necessary to the cure of Fever. And if it were confided to, only to remove those morbid collections of bile, which, by their irritation, tend to protract fever, and used only as an auxiliary to the more certain and speedy modes of subduing excitement, its service would be more

frequently acknowledged. But the powers of vomits and purges are too often overrated. They have been invested with an office, which, by the limited sphere of their action, they are unqualified to discharge. It is true they solicit an increased determination to the stomach and bowels, and thereby force an inconsiderable discharge of serous fluid; but this in itself is insufficient to relieve the whole system of its oppressive burthen, and is moreover the effect of an irritative action, which according to our conceptions, would more than counterbalance the partial evacuation. We therefore consider purges and vomits as defective, and of course inadequate, in the extent to which they are usually employed, to produce that condition of the system which justifies the use of bark.*

It is necessary then, that we have recourse to some remedy better calculated to allay the action connected with intermitting fever, and thereby to prepare the system for its safe and efficacious application.

The competency of bloodletting for this purpose, has been long since acknowledged. Even

* I am aware that these remedies may be used with advantage, on the principle that a natural or artificial weak part will divert morbid action from another, laboring under high excitement: but it is evident that such a plan is too dilatory and indecisive, to usurp the place of the more prompt and certain mode of reducing it.

those who have so zealously advocated the use of bark in intermittents, as to consider all previous evacuations a mere loss of time, have witnessed cases in which cathartics and emetics were not only necessary, but which required venesection. Cleghorn, tho' he experienced the best effects from bark, even in obstructions and inflammation of the viscera, informs that he "used to take away blood from people of all ages "laboring under Tertian fever, when he was "called in the beginning of the disease. And "further if the symptoms continued urgent for "two or three days, he repeated the operation; "by which seasonable evacuations the vehemency of the paroxysms was diminished, the "apyrxies became more complete, and the terrible symptoms which often appeared about the "height of the disease, as difficulty of breathing "and inflammation of the abdominal viscera, "were either prevented or mitigated."

Saunders' attachment to the bark was so rivetted, as to lead him to think, it could never be exhibited too early in intermittents. He derived great benefit from it, in symptoms, as difficult breathing and pain in the side, which he acknowledges, had they occurred distinct and independent of intermitting fever, would have forbid its use; which is no less than admitting

bark to be an infalliable antidote, applicable in all cases, capable of frightening into submission by the formidable exertion of its force, the most alarming anomalies, (should they associate with its declared opponent) which under opposite circumstances, it would have converted into outlets of life. He declared his opposition to all evacuations, previous to its exhibition. Nevertheless he has seen every symptom of fever, attended with general inflammatory diathesis, aggravated by bark, and has, in violence to prejudice, acknowledged that evacuations adapted to subdue them, should be premised to its exhibition.

Testimonies of the necessity of bloodletting, previous to the employment of bark, in intermittent fever, might be multiplied to a tedious extent. Nor do I hesitate to credit the numerous cases recorded by authors, of its having afforded the most ample benefit, without preparatory evacuations. But I cannot conceal that their evidence is somewhat impaired, by an unreasonable partiality for a favorite medicine, manifested in their warm recommendation of such a practice without any discrimination.

Being persuaded that every intermittent does not demand the practice which we have recommended, we shall proceed to enquire under what

circumstances, it is particularly necessary to premise bloodletting to the use of the bark.

I. The disease is connected with great action, as it occurs in spring. This is peculiarly favored by the superior temperature of this season, acting on a broad surface of excitability, accumulated during the torpor of the preceding winter. Hence all writers concur in affixing to vernal intermittents, the character of high arterial excitement; the accuracy of which is confirmed, by the frequency and violence of inflammatory diseases of every form in this season. Autumnal intermittents sometimes refuse to yield to the usual remedies, and are protracted into the winter months. The pulse is then full and hard, and the blood, when drawn, is for the most part sizy. The disease in both these seasons resists the bark, and gives way to venesection only.

II. It occurs frequently during the prevalence of an inflammatory or malignant epidemic. It then assumes the essence of the epidemic, or is only a disguised form of it. The yellow fever has repeatedly made its appearance under the mask of an intermitting fever, in the city of Philadelphia. The violence of the counterfeit is equal to that of the epidemic, in its most genuine form, and yields only to the remedies employed to subdue it.

III. But the necessity of premising blood-letting, before the use of bark, is not confined to vernal intermittents, or those connected with a malignant atmosphere. Records are not wanting of autumnal fever, being complicated with the most obstinate and alarming inflammatory symptoms. We must therefore be directed by the state of the system, which will indicate bleeding in all those deviations above the natural arterial action, denoted by a full, hard or tense pulse.

Thus have we endeavored briefly to point out the causes which have prevented invariable success, in the use of bark in the intermitting state of fever, and to ascertain the circumstances which should regulate its management, in order to attain it. The former are found to consist, *1st*, in an unlimited confidence in bark as an antidote to intermittents, *2dly*, in an erroneous idea that these are always connected with feeble action, *3dly*, when known to be connected with high excitement, trusting to repetitions of the disease to wear it down, or relying in emetics and purges to reduce it, to the exclusion of the more certain mode of depleting by venesection. The latter consist in, *1st*, attention to the season, *2nd*, to the constitution of the atmosphere, and *3rd*, to the pulse.

After having so fully insisted on the necessity of a reduced system to render bark safe and effectual, we have no difficulty in understanding, how it should have signalized its utility in those low grades of morbid action, which accompany the gangrenous and chronic states of fever.

The morbid effusions which attend the gangrenous state of fever, have been considered as resulting from a putrefactive process engendered in the body. Of course the efficacy of bark was referred to its strong antiseptic power, which enables it to resist putrefaction in dead animal substances. But we are now taught, that such a process is incompatible with life. And observations on the operation of palpable hurting powers on animal bodies, in producing similar appearances, prove that they are effects of disorganization of the solids and fluids, produced by the excessive force of those powers. The good effects of bark, in this disease, must therefore be referred to that acknowledged power, by which it imparts vigor to the arteries, in every other case of enfeebled excitement.

In the chronic state of fever, the application of bark can never be too early. The system in this disease, from the commencement of its invasion, is depressed to that state of quiescence, in which a weak and frequent pulse, a disposi-

tion to sleep, torpor of the alimentary canal, and other marks of debility appear, produced by the subduction of some of the essential agents, destined to support the health of the body. In this condition of the system, a copious application of bark might be thought necessary; but a law of the animal œconomy, whose agency has not been observed till late years, prohibits it. When the energy of its motions is enfeebled, by the removal of the powers which sustained them, the excitability or medium of motion undergoes a proportional increase, and disposes them to occur with greater violence, on the application of stimuli, even less than natural. Much caution then, we think, is necessary in the administration of bark in the chronic state of fever. particularly in its first periods. If in these, the medicine should be given in large quantity, there can be no question, that it would excite an action more dangerous and difficult to subdue, than the original one. The injudicious use of bark, may perhaps be classed among the causes of the symptoms of Synocha, which this disease has been sometimes observed to assume in its progress.*

Of the modes of applying Bark.

These may be reduced to two general heads,

I. Its internal applications. 1st, to the sto-

* Rush's Medical Inquiries, etc. Vol IV.

mach. Practitioners have always preferred giving it in substance ; and it must be allowed, that when the stomach is capable of retaining it, this is the most effectual mode of exhibition. But cases frequently occur, in which the pure undisguised powder cannot be borne, without producing nausea, a sense of oppressive weight or some other inconvenience, which, tho' they do not justify a total suspension of the medicine, call for a variation of it.

This may be answered by the infusion or decoction, and tincture. Physicians have been induced to employ these preparations, not only with the view to accommodate the force and activity of the medicine to the different grades of disease, but to impart to a drug, extremely offensive to some, a more agreeable relation to the taste, which would ensure it the retention in the stomach necessary to its undisturbed operation.

Tho' less ungrateful than the bark in powder, these preparations are not without some disadvantages. The infusion appears best adapted to the first stage of the chronic state of fever, and those stomachs disposed to reject the powder. It would certainly be the most suitable form in diseases of children, in which this medicine is indicated. But water being incapable of dissolving the resin, in which much of its power is

contained, the infusion is not so efficacious where the whole energy of bark is demanded. Dr. Saunders, speaking of red bark, says, its powers are so well preserved in combination with water, he has never had recourse to it in substance, and that the infusion of this species frequently cured intermittents, which resisted the pale bark in substance.*

The decoction is only preferable to the infusion, as it is more speedily prepared in cases of emergency. Tho' the resin may be melted out by the boiling heat, and diffused in the water, as soon as its temperature is sufficiently lowered to allow it to be exhibited, this is deposited, and reduces its power to an equality with that of the infusion.

The addition of spirit in the tincture renders the bark more agreeable, and (this menstruum being charged with all its virtues,) much superior, independent of its potent vehicle, to the other preparations. But a very serious objection presents itself to a liberal use of it. From habit, that plastic principle of man, he readily cultivates associations, which by their irregula-

* From my own experiments, there is reason to believe that the infusions of bark possess much activity; but I am disposed to think that the strength of the pale bark in Dr. Saunders' time must have been much impaired, for it is now generally preferred to the red.

rity insidiously undermine the robustest constitution, and obstruct the best directed efforts of nature for the preservation of health. And to the disgrace of human nature, and the multiplication of diseases, does none take such rapid root as that which leads to an habitual love of ardent spirit. It becomes then the common duty to arrest such unnatural tendencies, and to grasp at every expedient which will conspire to their extirpation. Medicines disguised in spirituous vehicles, have often created a fondness for them, which not all the terrors of disease could destroy. The tincture of bark should therefore never be employed, in those obstinate fevers which require a repeated and long continued use of that medicine, nor ever but when the occasional use of cordials is necessary.

Frequently to the mortification of the practitioner, every form of bark by which the disease can be attacked thro' the medium of the stomach, is denied a fair combat with it; either by its inability to retain them, or by the long opposition of the stimulus of the medicine, producing a disobedience in that organ, to its impression.

Under these circumstances the operation of bark has been trusted to its application. 2dly, to the rectum. In this way, its good effects have been often

evinced. Curious to know its precise effects, when thus applied, with the assistance of my obliging friend, Mr. Hutchinson, we injected into the rectum of a healthy robust young man, half an ounce of yellow P. bark, his pulse beating 72 in a minute. In 5 minutes it beat 72; in 10—72; in 15—72, with increased force: in 20—72, very active and the injection repeated: in 30—72, his face now flushed: in 40—80; in 50—76; in 60—72, with increasing activity.

It has been pleasantly remarked, that the anus is the most suitable avenue to the introduction of ungrateful medicines into the body; and I am convinced if this were the established mode of exhibiting not only bark, but all medicines whose efficacy depended on their operation being propagated to remote parts, their aid would be earlier applied for, and concealment and neglect from aversion to physic, would cease to be causes of the aggravation of disease.

As the brave and enterprising general is not discouraged from his purpose, by an unsuccessful attack on one part of a besieged fortress, but is emboldened by disappointment and repulsion to attempt every part, so the circumspect and skillful physician never abandons his patient to the uncontroled ravages of disease, till every

inlet, through which his implements can obtain an engagement with it, has been tried.

A very convenient one, by which this end may be accomplished, is afforded by the skin. This organ, though not so exquisitely endowed with the principle, which gives to the alimentary Canal its preeminence, as a medium of the operation of medicines, is abundantly supplied with the aptitude for imperceptible motion, and is thereby capacitated to receive and to transmit the qualities of bark to the throne of its operation. Upon this is founded—

II. Its external applications. These have been used, first in the form of bath. This mode promises advantage in all diseases of infants which indicate the bark, but from the quantity requisite, the expence attending it seems to have prevented as frequent trials of it, as are necessary to establish its reputation.

A second very convenient external application is afforded, by enclosing the powdered bark between two portions of cloth, in the form of a waistcoat. This method was originally suggested by the difficulty of exhibiting the medicine to children. Doctor Pye has communicated the results of twelve cases, in which this application was employed with the happiest effect, in children from six months to six years old*. But the bark jacket has not only proved

serviceable, in the diseases of the earlier stages of life ; it has been worn with much advantage by adults. It afforded a sanctuary to the celebrated Dr. Rittenhouse, against the invasions of an intermittent, which had annually persecuted him.

To ascertain the effect of bark thus employed, my pulse beating 72, I applied to my abdomen four ounces of best red bark, quilted between the fold of a silk handkerchief. In 15 minutes 72 ; in 30—72, and fuller : in 45—76 ; in 60—76 ; in 80—58 ; in 100—72 ; in 120—70 ; in 140—68 ; in 160—68 ; in 180—64, with its force considerably increased. From this it may be inferred that the adult will find in the bark waistcoat a very convenient application, and particularly that it will afford to delicate habits, by preserving a moderate and equable arterial action, a preventive against the intermitting fever.

The modes of applying bark to the surface, which have been mentioned, are undoubtedly sufficient for all indications which that medicine in this way is capable of executing ; but as these may not always be readily procured, it occurred to me that a very good substitute to the jacket, might be derived from the extract.

Under this impression my pulse beating 68 strokes in a minute, I confined to my Epigastrium for four hours, a plaister of two drachms of this preparation reduced to nearly the consistence of paste. In 15 minutes 68, in 30—68; Mr. Morris who obligingly examined my pulse, thought it was increased in force at this period; in 45—68; in 60—72; in 75—76; in 90—68, and fuller in 105—68; in 120—68; in 135—64, quicker in 180—64. It was carefully attended to every 15 minutes through the remaining hour, without any variation of its frequency being observed, though the increased activity was unremittedly supported.

Thus we see, that whatever part of the body is subjected to the apposition of our medicine, its effects are principally evinced in the arteries. Whether this phænomenon is to be referred to the agency of the lymphaticks, or to that more subtile agent, which produces aptitude to motion in parts remote from those, which receive the first impulses of stimulating powers, is not for me to discuss; but I am disposed to adopt the last opinion. Under its influence, we conceive it unnecessary to have recourse to the mediation of the stomach, in order to comprehend this phænomenon, as it is presumable that the same medium, by which the action of bark is trans-

mitted from the stomach to the arterial system, connects this last with the skin.

On the time of exhibiting bark.

On no question relating to the management of Peruvian bark, has more discordance of opinion prevailed, than on the one now before us. Some have thought they derived more utility from it, when administered just before the period of accession of fever ; some have preferred giving it in large doses, immediately after the termination of the paroxysm, while others have adopted the practice of giving it, from the end of one paroxysm, to the beginning of another in small doses frequently repeated.

From this diversity of sentiment founded, no doubt, on the success, which the respective advocates of each, may have experienced in some cases from their favorite mode, we should be led to consider it a matter of indifference, at what season it be administered. Dr. Sydenham however has left his testimony against the first ; having observed that “ given in this way it often destroyed the patient by throwing him into continued fever ;” and I am disposed to believe that the last is the most rational practice.

This remedy can only cure fever by interrupting its catenation with the diurnal circle of

natural motions, thereby introducing a link more congenial to the order of the whole ; or in other words by preventing a repetition of paroxysms. By attending to the following circumstances, usually involved in a paroxysm of fever, we shall readily see how, when administered repeatedly during the intermission of the disease, it is best calculated to answer this indication.

The paroxysm consists in a violent exertion of the heart and arteries, which continues until the excitability is so expended, that it can be no longer supported ; when, as muscles relax after energetick efforts, they sink into a state of quiescence. Now if not opposed by the obtrusion of stimulus, the principle of animation accumulates, and at the return of the period with which the morbid action is conjoined, other circumstances concurring, the regular fit will be introduced. But if, on the other hand, a stimulus of considerable force, be applied immediately after the cessation of the arterial excitement, a very different condition of the system may ensue, and “ the constitution, says Dr. Darwin, will run into greater torpor occasioned by farther loss of sensorial power.” And again, if a preternatural stimulus be suffered to exert its full force on the system, immediately before the accession of the expected fit, when the excitability has been

reproduced to an excess, disposing to preternatural motion, an action will be excited transcending that of ordinary fever*. From its activity, I think we are warranted in averring that bark, administered under such circumstances, is capable of producing such hurtful effects, and consequently that the practice of giving it immediately before or after the paroxysm, in large doses is improper. In either case, though it may cut off the original disease, its place in the diurnal circle, we should suppose, will be supplied by others more dangerous and more pertinacious of the conjunction. The season then in which bark can be exhibited with the most safety, and with the best effects, is through the whole intermission, frequently repeated in small doses. This mode is farther recommended by the following circumstances. 1st. It prevents a superfluous collection of excitability which favors a violent and lasting paroxysm, and thus, though it should not repel the attack against which it is directed, it will at least mitigate its force. 2. Bark administered at this season, is not so apt to excite nausea and the inconveniences which attend it, when used either at the approach or after the cessation of the paroxysm in large doses.

* The doctrine of the effects of stimulant powers, applied to accumulated excitability, is so luminous and philosophic, rests upon so broad a basis, and is of such important and extensive application in the conditions both of health and disease, that it can scarcely receive too much consideration.

Med. Hist.

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